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AUTHOR Ausel, Dennis; Bieger, George R.
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ABSTRACT

The concept of adding pictures to text to attempt to produce significantly better recall when instructors are not available was examined in this study. Forty-seven undergraduates, selected from an original group of 90 who took the Group Embedded Figures Test, were classified as field independent or field dependent, and randomly assigned to one of three sets of procedural assembly instructions (picture alone, text alone, or text with picture). Individually, each participant was asked to assemble a model loading cart while the assigned instructions were at hand. Individuals who assembled a hand cart that was judged functional were asked to return 28 days later to reassemble the model without the instructions. Two dependent variables were used (time on task and assembly errors) for the immediate comprehension tasks and the delayed recall conditions. Results indicated that the type of instructions can produce significant differences in accuracy of performance for this kind of task, but that the effects on accuracy of the type of stimulus are not long-lasting. Conversely, while cognitive style did not produce significant differences in performance accuracy in the short-term, successful assemblers who were field-independent retained their assembly knowledge better than their field-dependent counterparts. With respect to stimulus type, pictures alone seemed to produce faster assemblies and text alone the slowest in the short term. However, in the long term, text alone produced faster recall assemblies. (5 references) (CGD)

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Authors:

Dennis Ausel
George R. Bieger

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by
Dennis Ausel
George R. Bieger

Indiana University of Pennsylvania
Indiana, PA 15705

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INTRODUCTION

Picture text instructions are often used to guide learners through a variety of tasks. These tasks range from assembling a lawn mower to operating a power plant. Past research indicates that the addition of pictures to text while the users have the instructions at hand, improves the comprehension of the instructions (Crandell, 1979; Bieger & Glock, 1982; Stone & Glock, 1981. Sometimes, however, the instructions are not at hand and the learner has to rely on his/her memory of the instructions. If the situation is life threatening, recall of the instructions may be critical. Recent research indicates that the addition of pictures to text improves recall of factual information (Anglin 1986; Rasco, Tennyson and Boutwell, 1975) however, no research could be found which indicated whether or not the addition of pictures to text aided in the recall of assembly tasks.

Another variable which might come into play is the learner's cognitive style. Some learners with certain cognitive styles may better at immediate comprehension and delayed recall than other learners with different cognitive styles. In addition their may be an interaction of cognitive style and picture/text formats.

PURPOSE OF THE STUDY

More specifically, the propose of this research project was to examine whether or not the addition of pictures to text will produce significantly better recall when the instructions are not available. In addition the study also examined the effects of cognitive style and the possible interactions on both immediate comprehension and delayed recall.

STIMULI

Three sets of procedural instructions for a model hand cart were employed. One set was sequential pictures alone, the second set was text alone and the third set was a combination of the sequential pictures and the text. All three sets of instructions had been employed in previous experiments and had been found effective.

COGNITIVE STYLE

Ninety student undergraduates were given the Group Embedded Figures Test. Twenty-five of the individuals identified as field independent and twenty-five of the individuals identified as field dependent were asked to participate in the experiment. Of the fifty individuals, forty-seven were able to participate.

PROCEDURES

The forty-seven undergraduates who were classified as either field independent or field dependent were randomly assigned to one of the three sets of procedural assembly instructions (i.e. text alone, pictures alone or pictures plus text). The learners were tested individually.

Individually,each participant was asked to assemble the model loading cart while the assigned instructions were at hand. Individuals who assembled a hand cart which was judged functional were asked to return 28 days later to reassemble the model without the instructions. Two dependent variables were employed(time on task and assembly errors) for the immediate comprehension task and the delayed recall conditions.

RESULTS

Assembly procedures were subdivided into two categories; those critical to the construction of a "functional" loading cart, and those not critical to the construction of a "functional loading cart.

A 3 x 2 x 2 ANOVA was conducted to examine the effects of Cognitive Style (Field Independent-Field Dependent), Stimulus Type(Picture Alone, Text Alone, Text with Picture), and Gender (Male-Female) on performance, using accuracy scores and assembly times for critical sub-assemblies as the dependent variables.

Those subjects presented with Text Alone were significantly less accurate on critical subassemblies than were subjects who received either the Pictures Alone or Text with Pictures (Text Alone - 13.50, Picture Alone - 15.47, Text with Pictures - 16.00). There were no other significant main effects or interactive effects pertaining to accuracy on critical subassemblies.

On the non-critical subassemblies there were no significant differences for any of the main effects, nor were there any significant interactions.

Subjects differed significantly in the total time needed to complete the assembly depending on which set of instructions they received and as a function of their cognitive styles. Subjects using the Picture Alone instructions completed their assemblies fastest (11.21 minutes), with those receiving Text with Pictures performing significantly slower (12.67 minutes), and those using the Text Alone being significantly slower still (13.75 minutes). Field-Independent subjects completed their assemblies significantly faster (10.61 minutes) than did those who were Field-Dependent (13.47). There

were no significant differences between males and females, nor were there any significant interactions.

Those subjects who completed "functional" loading carts were asked to return for a second session one week after the initial assembly session. At the second session subjects were asked to perform the assembly again without use of any instructions at all. As in the initial part of the study, time of assembly and accuracy on critical subassemblies were examined as dependent variables in the Recall part of the study. These measures of performance were examined for differences attributable to Cognitive Style, original Stimulus Type, and Gender.

Field-Independent subjects performed significantly more accurately on the critical subassemblies than did Field-Dependent subjects (12.83 vs. 8.53). There were no other significant main effects or interactive effects pertaining to performance accuracy. As expected, accuracy scores in the Recall phase of the study were generally lower than in the first part of the study.

Subjects differed significantly in the total time needed to complete the assembly during the Recall phase, depending on which set of instructions they had received in the first session. Subjects who had used the Text Alone instructions completed their recall assemblies fastest (10.75 minutes), with those having used the Picture Alone performing significantly slower (16.42 minutes), and those having used the Text with Picture instructions being significantly slower still (20.42 minutes). There were no significant differences as a function of cognitive style in recall times nor were there significant recall assembly time differences between males and females.

There was a significant two-way interaction between Stimulus Type and Cognitive Style, however this interaction was judged by the researchers to be due largely to one extremely fast assembly.

DISCUSSION

The results summarized above indicate that, at least for this task, the type of instructions (Text, Picture, or Text with Picture) can produce significant differences in accuracy of performance, but that the effects on accuracy of the type of stimulus are not long-lasting. Conversely, while cognitive style did not produce significant differences in performance accuracy in the short-term, successful assemblers who were Field-Independent retained their assembly knowledge better than their Field-Dependent counterparts.

With respect to speed of assembly, the effects of stimulus type are more complicated. In the short term, pictures alone seem to produce faster assemblies and text alone the slowest. However, in the long term, text alone produced faster recall assemblies.

The differential effects of stimulus type and cognitive style on both initial performance and longer term recall are worthy of continued examination in future research.

REFERENCES

Anglin, G. J. (1986). Prose-relevant Pictures and older learners recall of Written prose. Educational Communication and Technology Journal, 34, 131-136.

Bieger, G. R. & Glock, M. D. (1982). Comprehension of spatial information in pictures and text. Technical Report Number 6, Personnel and Training Research Programs, Office of Naval Research (Code 458), Arlington VA, 22217

Crandell, T. L. (1979). The effects of educational cognitive style and media format on reading procedural instructions in picture-text amalgams. Unpublished doctoral dissertation, Cornell University.

Rasco, R.W., Tennyson, R. D., & Boutwell, R.C. (1975). Imagery instructions and drawings in prose learning. Journal of Educational Psychology, 67, 188-192.

Stone D. E., & Glock M. D. (1981). How do young adults read directions with and without pictures? Journal of Educational Psychology, 73, 419-426.